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INSTITUTE

BARBADOS

# ANNUAL REPORT

OF THE

# Department Of Science and Agriculture

FOR THE YEAR

# 1945—46

ADVOCATE CO. LTD.,—PRINTERS.

# REPORT ON THE WORK OF THE DEPARTMENT OF SCIENCE AND AGRICULTURE

## For the Year Ending the 31st March, 1946.

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## STAFF.

Dr. S. J. Saint, C.M.G., O.B.E., M.Sc., Director of Agriculture, who is also Controller of Supplies, was granted ten days' duty leave with effect from the 3rd of October, 1945, for the purpose of enabling him to attend meetings in Trinidad of the Advisory Committee of the B.W.I. Central Sugar Cane Breeding Station and of the B.W.I. Sugar Technologists' Association. Consequent on the above, Mr. R. W. E. Tucker, M.A., B.Ed., Entomologist, acted as Director of Agriculture and Mr. G. D. Owen, C.M.G., as Controller of Supplies.

Dr. Saint, was granted two months' sick leave with effect from the 2nd of January to 28th February, 1946, and Mr. Tucker, again acted during this period as Director of Agriculture.

Dr. A. E. S. McIntosh, Deputy Director of Agriculture and Geneticist of the B.W.I. Central Sugar Cane Breeding Station, who proceeded to England on the 19th of January, 1945, on six months vacation leave, was transferred to the Malayan Department of Agriculture as Research Officer with effect from the 19th of August, 1945.

Mr. F. H. B. Blackburn, B.Sc., A.I.C.T.A., Chemist, visited Trinidad on two weeks' duty leave, commencing from the 15th of March, 1945, to study the agronomical work being carried out by the Department of Agriculture in that colony. Mr. Blackburn also attended the B.W.I. Sugar Technologists' meeting held in Trinidad in October, 1945, for which purpose he was granted seven days' duty leave from the 6th of October.

Mr. C. A. Coppin, B.A.Sc., Government Analyst, who is also President of the Barbados Civil Service Association, was granted fourteen days' leave from the 27th of February to the 12th of March, 1946, to enable him to attend as a delegate of the local Civil Service Association, the West Indian Civil Service Conference held in Trinidad.

Mr. F. A. Sweet, B.Sc., Lecturer in Natural Sciences, was granted six months' vacation leave which he spent in the United Kingdom. He left Barbados on the 24th of June, 1945, and returned on the 23rd of February, 1946.

Mr. D. M. Hanschell, B.Sc., A.I.C.T.A., Botanist, visited the Imperial College of Tropical Agriculture, Trinidad, from the 2nd to the 15th of January, 1946, for the purpose of studying research work there with particular reference to recent introductions of leguminous and other fodder crops.

Mr. A. G. Mill, Livestock Officer, was granted twenty-one days' duty leave from 21st May, 1945, for the purpose of visiting Jamaica and discussing West Indian livestock problems with the Inspector General of Agriculture and to see the livestock breeding work in that Colony before framing a local livestock policy. On the return journey, stoppages were made at St. Kitts and Antigua.

Mr. D. W. Wiles, Fishery Officer, left this Colony on the 21st of October, 1945, to undergo a course of training in fishery matters in the United Kingdom.

## I. WEATHER AND CROP PRODUCTION

Rainfall throughout the year totalled 56.67 inches, which was 12.66 inches less than the total fall for 1944 but up to normal standards for Barbados. The weather during the three months January to March, 1945 was dry, the average monthly precipitation being 0.90 inches; this dry spell was broken during the month of April with an average fall of approximately 5.00 inches. The total rainfall for the period July to December, 1945 was 16.27 inches less than in 1944, and the peak rainfall of 10.29 inches occurred in August.

2. Distribution of rain for the Island as a whole during 1945 was irregular and unsatisfactory. The weather during the period October-December was comparatively dry, the rainfall during the months of October and November being much below average. The unfavourable weather conditions which were experienced during this critical period of growth adversely affected the production and development of late tillers in the plant canes, and greatly retarded the general growth of ratoons. On account of these unfavourable weather conditions, the crop was estimated at the end of December, 1945 at the equivalent of 120,000 tons of sugar. Fortunately, the rainfall during the months of January and February, 1946 was above the average. These rains allowed the sugar cane crop, particularly the ratoons, to make good growth late in the season.

3. These favourable late weather conditions, together with the high recovery obtained as the reaping season advanced, have caused the original estimate of 120,000 tons to be increased to the equivalent of approximately 130,000 tons of sugar. The acreage under plantation cane in 1945 was 3,153 acres greater than in 1944.

4. The 1945 sugar crop had shown promise of being one of the largest on record, but it is estimated that the equivalent of some 20,000 tons of sugar was lost through fire and delay in reaping caused by labour difficulties.

5. Owing to the delay in harvesting the sugar cane crop in 1945, due to unsettled labour conditions, planters were unable to prepare land in time for the planting of ground provisions. On account of this, yams and eddoes were not planted until late in the year and the acreage was greatly reduced. The acreage under 'spring' sweet potatoes was negligible, particularly in the high rainfall districts. As a consequence, there has been a severe shortage of these crops, and planters are finding it exceedingly difficult to obtain planting material for the next yam and eddoe crops in 1946-47.

6. The yield of seed cotton was low. The main factors which influenced this poor yield were, the lack of control of the leaf defoliator (*Alabama argillacea*) by spraying with insecticides, the unfavourable weather conditions during October and November, and the compulsory shortening of the harvesting season to meet the change in the dates of the closed season.

## II. SUGAR

7. The 1945 sugar crop amounted to the equivalnet of 119,448 tons of sugar, made up as follows:—

| | | |
|---|---|---|
| Vacuum Pan Factories .... | 98,120 | tons |
| Muscovado .... .... | 1,113 | ,, |
| *Fancy Molasses .... .... | 20,215 | ,, |
| | 119,448 | |

8. The crop to be reaped in 1946 is estimated at 130,000 tons.

9. The position with regard to local consumption of sugar and exports of sugar and fancy molasses during the quota year 1944—45 may be summarised as follows:—

*Estimated stocks in hand for export at 1st September, 1944:*

| | | tons |
|---|---|---|
| Fancy Molasses .... .... .... | 9,363 tons | |
| Sugar .... .... .... .... | 45,360 ,, | 54,723 |
| Production: Crop 1945 .... .... | | 119,448 |
| | | 174,171 |

*Estimated stocks in hand for export at 1st September, 1945:*

| | | |
|---|---|---|
| Fancy Molasses .... .... .... | 5,574 tons | |
| Sugar .... .... .... .... | 8,908 ,, | 14,482 |
| | | 159,689 |
| *Total export for quota year 1944/45 as per Customs returns:* | | |
| Fancy Molasses .... .... .... | 23,223 tons | |
| Sugar .... .... .... .... | 120,845 ,, | 144,068 |
| *Difference representing sugar left in the Island for local consumption:* .... .... | | 15,621 |

10. The estimated production of sugar during 1945 for local consumption is 15,621 tons. This is in excess of our normal annual consumption and consequently it is expected that the production of sugar during 1946 for local consumption will be below normal.

11. The Fancy Molasses Control and Marketing Board has allocated some 60,000 puncheons (equivalent) of fancy molasses for production during 1946 for export. Of this quantity, some 42,800 puncheons have been allocated to small fancy molasses plants, and the remainder to larger vacuum pan Factories.

* Equated on the basis of 330 wine gallons per ton.

12. The returns received from plantations under the Sugar Cane Census Act for the 1946 crop show that there were 33,124 acres under cane made up of 14,056 acres of plant canes, 11,615 acres of first ratoons, 5,578 acres of second ratoons, 1,818 acres of third ratoons, 51 acres of fourth ratoons, and 6 acres of fifth ratoons. In addition, the acreage of cane estimated to be reaped by small holders is 7,000 acres, making a total of 40,124 acres as compared with 36,971 acres harvested the previous season.

13. A comparison of plant cane and ratoon figures with 1945 shows that there was a decrease of 495 acres of plant canes and an increase of 3,648 acres in ratoons of all kinds. The great majority of this increase was due to the reduction of the acreage of 'thrown-out' land under the Local Food Production (Defence) Control Order, 1942, No. 2.

14. The percentages of the total acreage under the various varieties to be reaped in 1946 are as follows:—

| B. 37161 | B. 34104 | B. 35187 | B.H. 10 (12) | B. 3439 | B. 726 | B. 4098 | B. 2935 | B. 35245 | B. 3013 | Other & mixed varieties |
|---|---|---|---|---|---|---|---|---|---|---|
| % 74.52 | % 6.89 | % 6.09 | % 3.19 | % 2.40 | % 2.02 | % 1.50 | % 0.68 | % 0.67 | % 0.52 | % 1.46 |

The acreage under B.37161 has still further increased over the previous year. The new seedling varieties, B.37161, B.35187, B.34104 and B.4098 occupied 89.06 per cent. of the acreage to be reaped by plantations.

15. The yields of both plant canes and ratoons were better up to the end of February, 1946 than were anticipated. This increase was due, principally, to the favourable weather conditions which were experienced during the months of January and February, 1946.

16. *Breeding.* The policy of increasing the variability of the seedling material by inter-specific crosses within the Genus *Saccharum* and inter-generic crosses with closely allied plants has been continued with very encouraging results. During the 1945 season, 114 crosses were made and seedlings were obtained from 90 of these. It is estimated that approximately 54,000 seedlings germinated and 25,413 of these were potted.

17. *Sugar Cane Seedling Trials.* The Select Seedling Trials reaped during the 1946 crop indicated that none of the B.43′ Series are likely to become commercial canes under Barbados conditions. Of the B.41′ Series, B.41211 and B.41227 continued to show promise of becoming commercial canes in Barbados, the former particularly for early reaping, and the latter for mid-early reaping. B.41227 enhanced its reputation by producing very few arrows in the experiments reaped. The variety B.4098, which has now been recommended for commercial plantings, maintained its reputation as a high yielding cane with very good juice quality both as plants, first and second ratoons, particularly in the high and intermediate rainfall areas.

18. *Mosaic Disease Resistance Tests.* Experiments using the Sein Method of artificial inoculation were continued with the object of evolving a fool-proof technique. During the course of these experiments results were obtained which tended to indicate that other factors besides humidity were involved. Further experiments will be necessary to elucidate these factors.

19. Selections of the B.43′ Series were inoculated with a view to ascertaining their reaction to mosaic disease of the strain carried by B.2935. These plants were rather old when inoculated, and only one showed the symptoms. The experiment will be repeated with more suitable plants during the coming season.

## III. COTTON.

20. The acreage under cotton for this season was 150¾ acres of which 16 acres were grown by plantations and 134¾ acres by peasants. The acreage for the previous season was 324½ acres. The total yield of seed cotton was 37,002 lb., made up of 6,554 lb. of plantation cotton and 30,448 lb. from peasants. The average yield per acre for plantation and peasants' cotton was 410 lb. and 226 lb., respectively. The average yield per acre for all plantings was 245 lb. The ginning percentage for the Island's crop, as recorded by the Barbados Co-operative Cotton Factory, was 26.7.

21. *Progeny Plot Selection.* Work was continued during the season with selfed seed obtained from thirteen plants selected from the progeny plots during the 1944–45 season and the standard variety B.1.

22. The selfed seed of the bulked cotton from the thirteen selections of the 1944—45 plots was grown at Codrington Experimental Station in a variety trial with B.1 as standard. Nine of these have been selected on yield of seed cotton per acre and ginning out-turn, and will be grown in a further variety trial next season; they are B.4401, B.4402, B.4403, B.4404, B.4406, B.4407, B.4410, B.4411 and B.4413.

23. A second variety trial was conducted at Codrington Experimental Station which included selections of the 'B.40′, 'B.41′, 'B.42′.and 'B.43′ Series with B.1 as standard. The strains retained were B.4001, B.4111 B.4204, B.4212, B.4301, B.4306, B.4308, B.4309 and B.4310. As soon as the results of the experiment have been analysed, the best of these strains will be retained for inclusion in a further trial with selections from the 'B.44′ Series and the standard B.1.

24. A sample of lint of the Island crop was sent to the Shirley Institute for a small scale spinning test.

## IV. MINOR CROPS.

25. *Fruit Trees.* The propagation and distribution of economic fruit trees was continued during the year under review. A total of 1,082 trees was distributed; of these 882 were budded citrus, chiefly limes, oranges and grapefruit, and the remainder were made up of budded avocado pear, guava, Barbados cherry, pawpaw, fig, breadfruit and grape. In addition, 3,800 dwarf coconuts were imported from St. Lucia and distributed.

26. *Indian Corn.* A field trial was carried out at Codrington Experiment Station in which the following varieties were included:—(1) Select-

ed Barbados, (2) Hawaiian Field Corn, (3) Jamaica Selected-Yellow. The ears of the Jamaican and Hawaiian varieties were severely stripped by birds during the ripening stage, and in yield of grain per acre the Barbados corn was far superior. This is in agreement with previous experience, for in all tests which have been carried out, imported varieties have always proved inferior in yield to the local corn.

27. Subsequent to the reaping of the above trial, bulk plantings of the Barbados and Hawaiian varieties were made for the purpose of mass selection.

28. *Cow Peas.* Seed multiplication of twelve varieties from Jamaica was continued. Of these, eight varieties have been finally selected and sufficient seed obtained for the sowing of a definite trial. The selected varieties are as follows:—

| | | | | |
|---|---|---|---|---|
| No. | 1 | Caroline .... | — | Portland, Jamaica |
| | 3 | Iron .... | — | Davis—California |
| | 5 | „ .... | — | Sind—India |
| | 7 | „ .... | — | Java |
| | 9 | Blackeye .... | — | Davis—California |
| | 11 | Brabham .... | — | „ „ |
| | 12 | Derived from Caroline | | |
| | 14 | Pardo Claro .... | — | Brazil |

29. *Forage Crops.* (a) *Sour Grass-Legume Meadows.* It has been observed that many of the sour grass meadows in St. Philip and Christ Church carry quite a considerable growth of various leguminous species, chiefly *Clitoria ternatea, Teramnus labialis* and *Rhynchosia minima.* Since October, 1944, one of these meadows at Union, St. Philip, has been under investigation for yield of herbage and persistence of leguminous species under various frequency of cutting and manurial treatments. A summary of the results obtained up to the present is given below:—

| *Date of Cutting* | *Mean Yield Green Herbage* | *% Leguminous species by weight* |
|---|---|---|
| Oct. 1944 .... .... | 8.69 tons/acre | 56 |
| Jan. 1945 .... .... | 2.66 „ | 23 |
| July 1945 .... .... | 3.30 „ | 18 |
| Oct. 1945 .... .... | 8.45 „ | 55 |
| Jan. 1946 .... .... | 2.75 „ | 30 |

The analysis of the mixed herbage as compared with sour grass alone, is as follows:—

| | *Sour Grass* | | *Mixed Herbage* | | |
|---|---|---|---|---|---|
| | *Wet Season* | *Dry Season* | *Oct.* | *Jan.* | *July* |
| | % D.M. | % D.M. | % D.M. | % D.M. | % D.M. |
| Ash .... .... .... | 8.5 | 10.8 | 9.5 | 12.6 | 11.0 |
| Ether Extract .... | 2.7 | 2.8 | 1.8 | 1.6 | 1.9 |
| Soluble Carbohydrate .... | 50.0 | 50.9 | 48.5 | 48.8 | 47.2 |
| Crude Fibre .... .... | 35.0 | 33.1 | 32.4 | 31.1 | 33.3 |
| Protein .... .... | 3.8 | 2.4 | 7.7 | 5.7 | 6.4 |

The investigation is being continued.

(b) *Lucerne.* The observation plot of the variety Hairy Peruvian at Codrington Experiment Station was maintained and, in addition, a second plot of approximately one-fortieth acre was sown at the Home Agricultural Station, St. Philip. From the performances at these two stations it would appear that Lucerne may prove to be a promising fodder crop where irrigation is available.

(c) *Gram.* From eight types obtained from Jamaica the following four have been selected for further testing as short-term forage crops:—

Mung Bean No. 2 (*Phaseolus aureus*).
" " No. 3 " "
" " No. 7 " "
Jerusalem Pea (*Phaseolus trinervius*)

(d) *Kudzu* (*Pueraria thunbergiana*). Approximately twenty plants were grown in pots from seed obtained from Jamaica. In the initial stages the plants were extremely chlorotic and it was not until they had been transplanted to an eroded hillside at Haggatts in the Scotland district did they grow satisfactorily. It would seem that this crop is susceptible to lime induced chlorosis and its use would therefore be limited to the soils of the Scotland Series.

(e) *Recent Introductions.* The following grasses and legumes have been introduced from the Imperial College of Tropical Agriculture, Trinidad, for trial.

GRASSES

*Brachiaria dictyoneura.*
" *brizantha*
" *decumbens*
" *mutica*
*Chloris gayana* (Rhodes Grass)
*Cynodon transvaalensis* (Transvaal Grass)
" *sp.* (Giant Star Grass)
" *plectostachyon* (Star Grass)
*Dicanthium* sp. (Blue Grass)
*Eremochloa ophiuroides* (Centipede Grass)
*Eriochloa polystachia* (Malojillo)
*Hyparrhenia rufa* (Jaragua Grass)
*Panicum spectabile* (Colonião Grass)
*Paspalum dilatatum* (Dallis Grass)
" *plicatulum*
*Pennisetum purpureum* var. Merker.
.. " var. Florida
.. " var. Uganda
*Pennisetum* x Millet Hybrid
*Zoysia matrella* (Manila Grass)

LEGUMES

*Calopogonium muconoides*
*Indigofera subulata*
*Dolichos Hosei*
*Pueraria phaseoloides*

## V. FOOD PRODUCTION

30. As in previous years, the acreage of food crops grown was regulated by Notice served under the Local Food Production (Defence) Control Order, 1942, No. 2.

31. During 1945-46, it was decided to reduce the acreage required to be planted in food crops from 35% to 26%. This was done in view of the expected improvement of shipping facilities which would enable the colony to return to many of its former sources of food. The areas of crops to be grown were as follows:—

*'Preparation' land* (20% of arable land)

| | |
|---|---|
| Yams .... .... .... .... | 46% |
| Sweet Potatoes .... .... .... | 34% |
| Corn, eddoes, pulses, etc. .... .... | 20% |

*"Thrown-out"..land* (minimum of 6% of arable).

| | |
|---|---|
| Sweet Potatoes .... .... .... | 100% |

32. Weather conditions were very favourable for the planting of food crops in 'preparation' land as good rains were experienced in May, June and July. Full advantage however could not be taken to get in the requisite amount of ground provisions, due primarily to the regrettable delay in the reaping of the sugar cane crop brought about, to a large extent by very unsettled labour conditions over the whole Island. As a result, what little plantings were made were so late in the year as to render them almost uneconomic. The actual amount of food produced from 'preparation' land plantings was, for all practical purposes, negligible.

33. From returns received to date, it is ascertainable that the compulsory plantings of ground provisions in preparation and thrown-out land fell short some forty per cent. of the requirements under Defence Regultaions during the 1945-46 planting season. This figure represents an alarming state of affairs, as the food supplies of the Island are of primary importance and every effort must be made to supplement imported foodstuffs with locally grown food crops.

34. The Government Factory at Lancaster processed 26,292 bags of cassava meal for livestock consumption.

35. *Local Meat Production.* The regulations controlling the slaughter of cattle, sheep and goats were removed, while that forbidding the slaughter of pigs was retained.

36. All owners of plantations were required, as before, to keep a certain minimum of livestock of specified kinds.

## VI. AFFORESTATION SCHEME

37. The free distribution of young casuarina trees was continued, and a total of 5,784 trees was distributed during the period under review.

## VII. SOIL EROSION

38. Two schemes have been drawn up on the basis of proposals submitted by Dr. J. Beard, Assistant Conservator of Forests, Trinidad and Tobago,

and with the advice of Mr. W. A. Robertson, Technical Adviser on Forestry to the Secretary of State for the Colonies. The first scheme aims at the establishment of a Government Firewood Plantation at Walkers Savannah, St. Andrew, and the second provides for the rehabilitation of eroded and ruinate land in the Scotland District.

39. With financial aid from Colonial Development and Welfare funds (Schemes D.50 and D.13(r)), the experiments to find suitable ways of preventing soil erosion and reclaiming ruinate areas were continued.

40. *Reclamation of Eroded Hillsides.* No further plantings have been made on the hillside at Haggatts, St. Andrew. The trees which were planted in 1942 have continued to make good growth and, what is even more promising, an excellent natural ground cover has been established.

41. A further portion of the hillside was acquired with the purchase of Haggatts Agricultural Station. This area will be closed to man and beast and no trees planted until a ground cover has been established.

42. *Treatment of Semi-denuded Sour Grass Meadow on a Steep Slope.*—With the exception of the plots of *Albizzia lebbek*, *Lysiloma sabicu* and *Pongamia pinnata*, growth of the trees at Parks has been disappointing.

## VIII. PEASANT AGRICULTURE.

43. *District Agricultural Stations.* During the period under review, the following building was effected:—

(a) *The Home.* A dairy room, a milking shed, a loft and a water storage tank were built. A foreman's house was purchased.

(b) *Sayes Court.* A dairy room was outfitted and a foreman's house was built.

(c) *Groves.* A foreman's house, four additional pig pens and a ramp were built.

(d) *Jerusalem.* The house at Jerusalem was completed and a mule pen built.

(e) *Bullen's.* A house, a store room, a garage, cattle, sheep and pig pens were built. The foreman's house was completed.

(f) *Haggatt's.* A house, a store room, a garage, cattle, goat, pig and mule pens were built.

44. The Stations have been stocked with cattle, goats, sheep and pigs. These animals are being used to improve the livestock in this Island.

45. Crop rotations have been planned and started to fit in with the mixed farming programme of the Stations.

46. Market gardens have been started at all the Stations.

47. The Stations are being used for demonstration of mixed farming with maximum use of the land, improved planting practices, animal husbandry and market gardening.

48. *Educational and Advisory.* Lectures and demonstrations were given at the Agricultural Stations, at Elementary schools and on peasant holdings. The subjects dealt with included mixed farming, animal husbandry, market gardening, soil conservation, control of plant pests and diseases and the care of fruit trees.

49. *Survey.* The survey of peasant holdings started in 1944 was continued during the year when information from some 4,000 peasants, having more than one acre of land each, was collected. This information includes other occupations, conditions of ownership, planting system, cultivation and manuring, marketing system, livestock number and kind and source, and terms of money advances. The data it at present being analysed.

50. *General.* Four competitions were held under the auspices of the Department:—

| | | | |
|---|---|---|---|
| 1. | Peasants' Holding Competition .... .... | — 12 | prizes |
| 2. | „ vegetable garden competition .... | — 34 | „ |
| 3. | „ cotton plot competition .... .... | — 4 | „ |
| 4. | School vegetable garden competition .... .... | — 8 | „ |

Competition was exceptionally keen and the standard of peasants' holdings and vegetable gardens shows a marked improvement on previous years.

51. *Peasants' Loan Bank.* Loans amounting to £3,873 have been issued to four hundred and thirty-three persons for the payment of mortgages, purchase of livestock, irrigation, and cultivation expenses.

52. Of the total loans made, the sum of £3,106 was advanced to three hundred and seventy-seven persons for cultivation expenses of six hundred and twenty-three acres, of which three hundred and twenty-three acres were in canes and three hundred acres in cotton and food crops.

## IX. ANIMAL HUSBANDRY

53. The six local Agricultural Stations which were purchased during the previous financial year to serve as stud and demonstration centres were developed. A Central Livestock Station is being established to serve in place of the proposed Central Dairying and Stock Breeding Station and the Dodds Mixed Farming Experiment Station. It will also serve as a stud centre for the district.

54. The present complement of livestock at the seven stations is as follows:—

Service bulls 9, Service goats 15, Service rams 11, Service boars 10, Dairy cows in milk 19, Heifers in calf and empty 31, Bull calves for replacements 5, Heifer calves 13, Milch goats 9, Kids—bucks 3, does 2, Breeding sows 20, Store pigs 34, Horses 3, Mules 8, Donkeys 2.

55. The service fees charges are as follows:—

| | |
|---|---|
| Imported stud goats .... .... .... | 5/- |
| Cows (Grade bull) .... .... .... | 3/- |
| Goats (Grade buck) .... .... .... | 1/6 |
| Sheep (Black belly) .... .... .... | 1/6 |
| Pigs (Grade boar) .... .... .... | 2/- |

During the year, there were six hundred and eighty services by bulls, seven hundred and eighty services by goats, six hundred and forty-seven services by sheep and two hundred and eighty-eight services by boars.

56. Six buck goats and five does were imported for the purpose of improving the local stock. The imported does in kid to bucks other than the six imported, have now kidded. The imported stock are of Saanen, British Alpine and British Saanen blood. These goats will be kept at the Central Livestock Station as soon as the necessary housing accommodation has been provided.

57. Other livestock on order from external sources are as follows:—
1 Thoroughbred stallion (Williams Hill) *Felicitation Lentona*
1 Pedigree British Friesian Bull
1 Pedigree Guernsey Bull
1 Pedigree Jersey Bull
2 Pedigree Berkshire boars
1 Pedigree Essex boar

58. A pedigree Canadian Holstein Bull has been presented to the Government by Mr. and Mrs. G. Greene of Toronto, from their herd of high milk production Holsteins.

59. It is proposed to make the following charges for service by imported stud animals to arrive:—
Stallion —$12.00 + $12.00 per live foal thoroughbred + 50 cents groom fee;
$12.00 half bred mares + 50 cents groom fee;
Pedigree bulls—$5.00
Pedigree boars—$1.44

60. During the financial year the following sales of livestock were made:—
Bulls 1, cows 2, calves 11, pigs (old) 5, pigs (young) 89, sheep 6, lambs 8, goats 8, kids 7; total 137.
The amount accruing from the sale of these livestock was £250.

61. At the Central Livestock Station, it is proposed to maintain a herd of sixty dairy cows which will be graded up to the highest milk producing yield possible under tropical conditions. Replacements for the sub-stations will also be reared and eventually there will be a surplus of heifers and bulls available for sale.

62. Artificial insemination has been practised and the possibility of the sale of semen from imported stud animals to neighbouring islands unable to import expensive sires will be explored.

63. The imported stud goats are of different blood lines and will be used on the imported goatlings to produce stud goats of pure imported blood for distribution to the sub-stations and, eventually, for sale outside.

64. A herd of at least twenty sows will be maintained and bred to the imported boars for the production of good grade boars and gilts.

65. Twelve pens of poultry will be established, six of Rhode Island and six of White Leghorns, and accommodation set up to carry out laying trials

on behalf of the Barbados Poultry Association. Incubator and brooder house equipment will be laid down for the production of chicks for distribution.

66. During the year a survey of the existing dairies was made, a Milk Recording Society was started and every effort is being made to encourage the scientific breeding of livestock.

67. A scheme is being formulated for the establishment of a Central Pasteurization Unit to serve the Island as a whole. It is expected that this unit will purchase all milk produced in the Colony and will be a distributing centre. In this way, it is expected that the keeping of dairy cows will be encouraged with a consequent increase in the output of fresh milk, which output is at the moment below the Island's requirements.

68. It is proposed during the summer quarter to hold exhibitions for peasants' livestock at the District Agricultural Stations, and the Peasants' Agricultural Instructors in charge of the Stations are being given courses in judging.

## X. MANURIAL AND CHEMICAL INVESTIGATIONS

69. *Manurial Trials.* (a) *Sweet Potatoes.* A sweet potato manurial trial was carried out in 1945 on land in which both yams and sweet potatoes had previously failed to give manurial responses. It was felt that lack of response might be due to poor physical structure of the soil. Before planting the slips, therefore, an excellent tilth was obtained, and the soil drawn into contoured ridges. Under these conditions, an increase of 1,306 lb. of potatoes per acre was obtained from a 2:1:1 mixture of sulphate of ammonia, muriate of potash and superphosphate, applied at the rate of 4 cwt. per acre. The yield of the control plots was high when compared with recent returns from the same land.

(b) *Corn.* Manurial trials with corn, carried out in 1944 and noted in last year's Annual Report, showed that nitrogen, applied as sulphate of ammonia, caused large and economic increases in yield. Potash was ineffective. Trials carried out in 1945 confirmed the yield effect of nitrogen and showed that phosphate was ineffective. In order to decide upon the economic level of applications of sulphate of ammonia, the response of corn to the following treatment —

1. Control
2. 1 cwt. sulphate of ammonia per acre
3. 2 „ „ „ „
4. 3 „ „ „ „
5. 4 „ „ „ „

was determined at a centre with soil of low nitrogen content, and at a centre with soil of high nitrogen content. At both centres, the economic application was found to be 2 cwt. sulphate of ammonia per acre, causing an increase in yield of nine bushels of corn per acre.

(c) The results of these trials were published in detail in the Barbados Advocate.

(d) *Sugar Cane.* Trials designed to show the response of the new varieties of sugar cane to heavier applications of manure were reaped as plant canes at Bushy Park and Buttals during the period under consideration.

(e) Bulletin No. 4 (New Series) "Manurial Trials with Food Crops" was prepared and published.

70. *Prevention of Soil Erosion on Arable Land.* Twenty eight further demonstrations of soil conservation methods were laid down during the period under review. In each instance, contour bunds or contour drains were built at vertical intervals of six feet. It is encouraging to note that this method of preventing soil erosion has been adopted by several estate managers.

71. Bunds at Jerusalem and Groves District Agricultural Stations were planted continuously (i.e. using whole canes rather than setts) with B.34104. The cane has been most effective in preventing the disintegration of the bunds, being reaped as green fodder until the rest of the field was planted, and then allowed to grow to maturity with the field canes (in these cases B.37161).

72. The practice of paying labour according to the number of cane holes cut, rather than by the weight of cane cut, has militated against the use of contour furrows in conjunction with the above-mentioned contour bunds or drains. However, the cost of reaping the 1946 crop is being paid on a tonnage basis, and it may be confidently predicted, therefore, that the planting of cane in contour furrows, so successfully demonstrated at Groves District Agricultural Station, will become standard practice in Barbados.

73. Fourteen striding levels, referred to in the report for 1944—45, were built and distributed during 1945—46.

74. *Government Factory.* Operation of the Factory started on the 13th June and ended on 30th September, 1945. A total of 1,174 tons of feeding stuff was produced, comprising 26,292 bags of cassava meal. High efficiencies were maintained during operation, and occasionally output reached as much as fifteen tons daily.

75. The above meal was indispensable as a supply of carbohydrate during the difficult periods, and was used mixed with whatever feeding stuffs were available to make a reasonably balanced animal food. In addition, a saving of valuable shipping space was effected. When the value of this feeding stuff is equated against the current prices of similar carbohydrate foods, it will be seen that economically, the capital expenditure on the Factory has been completely resolved and its erection justified.

76. *Quicklime.* The natural gas fired continuous kiln at Apes Hill maintained an increasing output of high quality quicklime for cane juice clarification in almost all the factories throughout the island. The general demand for both quicklime and hydrated lime has now exceeded the capacity of this kiln and a larger kiln with an output of fifteen tons quicklime daily is in course of construction.

77. *Pottery.* Two gas fired kilns are now in operation by Messrs. Barbados Welfare Limited at Turners Hall. An increasing output and variety of ware has been maintained. Further development still awaits the arrival of an experienced Ceramist, who it is understood has now been selected.

78. *General Analytical Work.* The total number of samples analysed during the year as well as numbers and distribution for the past three years are summarised as follows :—

(i) General Analytical Laboratory—

| | 1943 | 1944 | 1945 |
|---|---|---|---|
| 1. Police Department .... .... | 412 | 350 | 343 |
| 2. Customs Department .... .... | 46 | 54 | 42 |
| 3. Water Works Department .... | 12 | 8 | 15 |
| 4. Agricultural Department .... | 110 | 316 | 176 |
| 5. Sanitary and Parochial Depts. .... | 265 | 371 | 334 |
| 6. Agricultural Society .... .... | 33 | 62 | 58 |
| 7. Other Government Departments .... | 39 | 76 | 80 |
| 8. Private .... .... .... | 112 | 140 | 108 |
| | 1,029 | 1,377 | 1,156 |
| (ii) Sugar Laboratory .... .... | 52,757 | 39,225 | 47,420 |
| Total .... .... .... | 53,786 | 40,602 | 48,576 |

## XI. INSECT PEST CONTROL.

79. *Sugar Cane.* Improved methods in the routine of mass breeding the egg parasite *Trichogramma minutum* were tried out during the year. These methods, which resulted in an earlier and increased production of parasites, were adopted entirely in the 1946-47 campaign.

80. In the 1945-46 parasite breeding season, a total of 395,439,700 *T. minutum* was bred, of which 346,009,700 were available for distribution to plantations.

81. The extent of moth borer infestation in the crop reaped in 1946 was determined by random counts of percentage cane joints bored, which were made at the usual twelve factories representative of all areas of the Island.

82. The results again show the maintenance of a satisfactorily low infestation by moth borer, the average of infestation recorded being 9.5 per cent joints damaged. This is the lowest annual average yet recorded.

83. The lowest individual figure was 4.9 per cent. average for the variety B.34104, and the highest was 12.0 per cent. average for B.35187. Other varieties examined were B.H.10(12), B.2935, B.3439, B.37161 and B.4098. There was an increase in the amount of B.37161 examined this year, and this variety alone accounted for over seventy-two per cent. of the random samples taken; its average joint infestation was 11.5 per cent. This figure for random sampling coincided well with the fact that the acreage under B.37161 was 74.5 per cent. A few random samples of the new variety B.4098 were obtained this year, and this variety gave an average of 8.5 per cent. joints bored.

84. Factory and field examinations of ripe cane showed a decrease in the amount of damage caused by the cane stem weevil *Metamasius sericeus*, which

may largely be attributed to a decrease in the amount of B.35187 seen in factory yards. Damage to canes by the termite *Nasutitermes costalis* was also less than that found last year.

85. Records were maintained on the relation between rind hardness of cane and incidence of moth borer attack; also on the incidence of *D. saccharalis* egg deposition in different cane varieties, and on the incidence of cane dead hearts in the young crop.

86. Field examinations gave indications of an increase in the numbers of *Diaprepes abbreviatus* (root borer beetle), and *Lachnosterna* (*Clemora*) *smithi* (brown hard back beetle), but not only are new cane varieties more vigorous in growth and more resistant to, or tolerant of, root damage thus making above surface indications of attack less obvious, but the late and irregular reaping of cane last year has caused ratoon growth conditions which simulate damage by these cane pests and so make external field surveys less informative.

87. *Food Crops.* Owing to the late, irregular and somewhat reduced plantings of food crops last year, very little new Departmental work was carried out on control of insect pests of food crops. Routine field examinations showed no major pest incidence, except in the case of the potato leaf hopper *Empoasca solana* which appeared to be fairly widely spread in sweet potato fields and caused some stunting of growth and reduction in yields. Trials with Gammexane and D. D. T. dusts are planned in this connection, but will be limited because of the extensive use of parasites in pest control in Barbados.

88. *Experiments with D. D. T.* Extensive spraying with five per cent. D. D. T. in kerosene was carried out in dwelling houses and live stock pens sheds, etc., at various Departmental Experimental Stations, after the regular trapping of house flies had established the general level of fly infestation. Subsequent to the sprayings, large numbers of flies were found dead each day in sprayed premises, and the number of flies caught in the traps decreased rapidly from thousands per day to insignificant numbers. In addition to this control over houseflies, which was maintained for a period of six to seven months after one complete spraying, control was obtained over such pests as cockroaches, crickets, centipedes, fleas, bedbugs, mosquitoes, ants and ticks.

89. A series of experiments was also carried out in the laboratory using cages painted inside with (a) D.D.T. incorporated in home-made white and colour water washes by means of five per cent. and eight per cent. D.D.T. solutions in kerosene, turpentine, boiled linseed oil and raw linseed oil; (b) D.D.T. incorporated in a similar fashion in white paint; (c) plain five per cent. D.D.T. kerosene, solution; (d) control cages.

90. These experiments showed that home-made white and colour water washes in which D.D.T. was incorporated by means of kerosene or turpentine solutions gave almost as rapid a kill of caged insects as did plain D.D.T. solution in kerosene. This method of applying D.D.T. in home-made water washes should be useful where spraying with five per cent. D.D.T. in kerosene is not practicable; it is also less expensive.

91. The solutions of D.D.T. in linseed oil, boiled or raw, made up into water washes was less effective, whilst the incorporation of D.D.T. in paints was, at the strengths used, almost ineffective. In these experiments the paint obviously inhibited the effect of the D.D.T. incorporated in it.

92. It would appear, from subsequent experiments, that the relative ineffectiveness of D.D.T. solutions in linseed oil is due to the fact that films of the linseed oil solutions when painted on to microscope slides, failed to give any D.D.T. crystalline deposit when they dried out. Similar films of D.D.T. solutions in kerosene, turpentine and alcohol dried quickly and gave very characteristic D.D.T. crystal deposits, and it appears to be the crystalline D.D.T. deposits on treated surfaces which kill insects which come in contact with it.

93. A short Departmental pamphlet has been published on the use of D.D.T. in Barbados.

94. One field experiment using the D.D.T. dust Gesarol was carried out on the control of *Laphygma* in growing corn. The results in comparison with lead arsenate were satisfactory but in view of the widespread use of parasites to control the major sugar cane pest *D. saccharalis*, the widespread field use of D.D.T. sprays or dusts in Barbados is not recommended.

95. The D.D.T. dust Neocid was tested against ticks on dogs, but successful use appeared to depend on the size and coat of the dog and on the extent of local tick infestation.

96. *The Insecticide Gammexane or 666.* A small sample of two per cent. and five per cent. 666 dusts was received in 1946; tests on a small scale against sweet potato leaf hopper are planned.

97. *Cotton Pests.* For the seventh year in succession, no pink boll worm (*Platyedra gossypiella*) was found, and for the encouragement of cotton growing, the cotton close season has been shortened and the planting date for cotton advanced to July 1st. Cotton defoliator (*Alabama argillacea*) was in most cases kept under control by spraying with lead arsenate.

98. *Cottony Cushion Scale.* This pest (*Icerya purchasi*) is still present in comparatively small numbers, and the introduced predator (*Rodolia cardinalis*) is also present in small numbers, but showed its capability during the year under review of overtaking and controlling one sudden increase which occurred in cottony cushion scale.

99. *Wood Ant Control.* The Wood Ant Inspector has been kept fully occupied inspecting and applying remedies against termites in churches, schools, Government buildings and private residences and had very little time for determination of wood ant damage in cane fields.

100. Control of Rats in Canefields. A large quantity of Zinc phosphide was imported for use by the Agricultural Society in preparing baits for use in canefields after reaping. A small sample of the new rat poison 1080 has been obtained for future trials.

## XII. PLANT DISEASES INSPECTION.

101. Two hundred and forty separate consignments of imported planting material were examined on arrival and admitted. Fourteen coconut plants were destroyed. Fifty bales of stained cotton lint, to be used in connection with the Experimental Spinning Plant, were examined and, as no cotton pests were found, they were admitted. No shipments of cotton seed or cotton seed meal arrived in the Colony during the year. The Cotton Close Season and the Okra Close Season was proclaimed to extend from 1st June, 1945, to 31st August, 1945.

102. Under the Sugar Cane Mosaic Disease (Eradication) Act, 1943, returns of inspection were as follows:—

April — seventy returns, seven infected holes found

July — two hundred and twenty-five returns, one hundred and sixty-four infected holes found.

All of the infected holes were destroyed. No areas were proclaimed as Infected Areas during the year.

## XIII. FISHERIES.

103. During the year a further sum of £3,000 was voted by the Legislature under Head XXIX. Miscellaneous Expenditure, in respect of loans to fishermen. One hundred and three applications for loans were approved by the Fisheries Committee during the period under review. A sum of £5,947. 12. 5. has been issued to date in the form of loans to fishermen. Repayments for the year amounted to £980. 19. 6., bringing the total amount repaid to date in respect of all loans issued to £2,325. 3. 2.

104. Twenty-seven new fishing boats have been constructed during the year, of which twenty-two have received assistance through loans. Losses of boats for the same period amounted to eleven; one boat which overturned and sank off St. James was salvaged through the efforts of the Fishery Officer.

105. Much attention has been given to improving the marketing facilities of fish in the Island, and the erection of a new Fish Market at Bridgetown is almost completed. This market is financed through monies made available by Colonial Development and Welfare. Administration of the Market is in the hands of Dr. C. P. Stoute, Superintendent of Markets.

106. Under a scheme for the improvement of channels along the Windward coast financed by Colonial Development and Welfare, blasting operations were carried out at Bathsheba with the object of widening and deepening the channel at Tent Bay. On the cessation of this work, preliminary reports tend to show that results have been successful, but a final decision can only be arrived at after observations have been made in the flying-fish season when the channel will be in constant use. A preliminary attempt was also made to improve the channel at Skeete's Bay off St. Philip, but operations had to be curtailed owing to the lack of electrical detonators.

107. In October, the Fishery Officer left the Island for the United Kingdom to undergo a course of training in fishery matters; this course is expected to last for a period of from six to nine months. Mr. O. E. Moseley, Clerical and Travelling Assistant to the Fishery Officer, has been appointed to act in his absence.

## XIV. AGRICULTURAL LEGISLATION.

108. 28th August, 1945, Peasants' Loan Bank (Amendment) Act, 1945 (1945-25). By this amendment the limit of the Bank's expenditure is not mentioned in the Act but is left to the Legislature which will be asked to vote moneys from time to time as the necessity arises.

R. W. E. TUCKER,

Acting Director of Agriculture.